tended to the older age groups, especially in the white population.

Of all tuberculosis deaths in Los Angeles City, approximately 40 per cent had never been reported as cases to the City of Los Angeles, insofar as could be determined from a search of the files.

SUMMARY

To review the facts on Los Angeles, different areas of the city vary in incidence from 50 to 250 cases per 100,000 population. Forty per cent of Los Angeles tuberculosis deaths are never reported as cases. Only 27 per cent of Negro tuberculosis deaths in 1943 were not reported as cases prior to death, whereas 48 per cent of white deaths were not reported. Only 20 per cent of tuberculosis cases are reported by private physicians. Only 16.8 per cent of cases were discovered in the minimal stage. M. D.'s reported 16 cases per 100 physicians per year; osteopaths 7 per 100 per year; chiropractors 2 per 100 per year. More than twice as many older adults were not reported prior to death, as young adults.

1734 North Fuller Street.

PROBLEM OF TUBERCULOSIS IN CALIFORNIA STATE HOSPITALS*

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THE problem of tuberculosis in hospitals for the insane and for the mentally deficient has long been recognized. Year after year, mortality statistics demonstrate that death rates within such institutions are many times as high as in the general population. In the United States about 5 per cent of all tuberculosis deaths occur in mental hospitals.

The California Health and Safety Code recognizes the problem by listing specifically amongst the functions of the Bureau of Tuberculosis the advising of officers of State institutions regarding the proper care of tuberculous inmates. In the 10 California mental hospitals, the statistics in regard to tuberculosis deaths speak for themselves. One hundred sixty-three patients died there of tuberculosis during the fiscal year 1942-43, out of an inmate population of 28,258 (as of June 30, 1942), giving a rate of 577, in contrast to the California rate of 50.9 for the year 1942. For the two types of institutions, the rate is 609 for the mental hospitals and 409 for the mentally deficient hospitals. The true rates are higher than these, since some of the patients, especially in the more deteriorated categories, die of tuberculosis without diagnosis.

CONTROL PROGRAM STARTED 13 YEARS AGO

The first beginnings of a modern control program were made by Dr. Fred O. Butler at the Sonoma State Home 13 years ago. X-ray films of each new admission, supplemented by segregation of infectious patients in separate buildings, were the pillars of his program. In 1939 two of the hospitals, Napa and Patton, were designated as central depots for the patients, whither diagnosed cases were to be sent from the institutions of the north and south respectively. Plans for new buildings for the tuberculous were drawn up, and the buildings at Patton were completed and have been used for this purpose for some time. Construction at Napa was delayed by the war, and when the building was completed, it was turned over for the duration to the Navy for psychiatric patients. The tuberculosis patients there remain in the old isolation wards. At Napa, Patton, and Sonoma at present there are 600 patients in buildings specially for tuberculosis, a total greater than the capacity of any tuberculosis sanatorium in California except Olive View.

The most extensive survey in State hospitals has been done in New York by the combined efforts of the New York State Department of Mental Hygiene and the New York State Department of Health, under the leadership of Dr. Robert E. Plunkett. In a preliminary study at the Newark State School for Mental Defectives, made in 1936, Dr. Plunkett found that 90 per cent of the patients over the age of 30 were positive to tuberculin. At that institution, with few discharges and close contact between patients, it was demonstrated that every case of reinfection-type tuberculosis, which developed during residence in the institution, could be associated with the presence of another infectious case in its immediate environment. On the other hand, among inmates who at no time were associated intramurally and intimately with a patient with open tuberculosis, not one case of reinfection type tuberculosis developed.

INTRAMURAL SPREAD OF TUBERCULOSIS

In 1938 it was discovered that, of all the patients on the tuberculosis register of Seneca County, New York, 23 per cent were or had been employed at the Willard State Hospital, which was located in the county, and that, in the preceding twenty-four months, 11 new cases of active tuberculosis had been reported amongst employees of that institution. This led to a thorough survey at Willard, which showed that of 3,407 patients, 76 (2.2 per cent) had active tuberculosis, 157 (4.6 per cent) had probably inactive reinfection tuberculosis, and 100 (3.2 per cent) had healed reinfection tuberculosis, or a total of 10 per cent had x-ray evidence of present or past adult type tuberculosis. In addition to this, 10.3 per cent had calcifications. Yet among 587 admitted in the year of the survey, only 3 per cent had reinfection tuberculosis. This demonstrated the tremendous rate of intramural spread of the disease. Two years later, all the patients were

* From the Bureau of Tuberculosis, California State Department of Health.

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rerayed, and only 16 (0.7 of 1 per cent) were found to have acquired new infection.

The experience at Willard led to a statewide plan involving all 26 of the institutions. The New York Legislature appropriated $45,000, which provided for two 4x5 mobile units, 50,000 4x5 films, additional 14x17 films, chemicals, two x-ray technicians, and three physicians. In July, 1941, work was begun with the following objectives:

a. X-ray of all inmates.

b. X-ray of old employees, and aid in their hospitalization if found tuberculous.

c. X-ray of new admissions.

d. X-ray of new employees (preëmployment).

e. Reray of employees on tuberculosis wards every three months, and of all other employees giving direct service to any patients every six months.

f. Close consultation between Department of Institutions and Department of Health.

g. Reëxamination of all inmates by x-ray after one year.

h. Adequate system of records.

i. Educational and prophylactic measures amongst employees.

TWENTY-THREE INSTITUTIONS STUDIED

This program was continued after the first year by further appropriations. Although the war made it impossible to obtain enough personnel to carry out all of the provisions of this plan, Dr. Plunkett was able to report that, in the first two years of the survey, 23 of the 26 institutions had been studied. Sixty-eight thousand, seven hundred forty-three patients had been x-rayed, and of these 4.7 per cent, or 3,220, had significant tuberculosis, while 4.6 per cent, or 3,151, had healed reinfection tuberculosis. Of the men 5.3 per cent, and of the women, 4.1 per cent had active infection. The highest rate in any institution as a whole was 8 per cent patients with active tuberculosis.

In the 14,228 employees examined during the same time, 151 (1.1 per cent) had significant tuberculosis, while 359 (2.5 per cent) had healed reinfection tuberculosis, giving a total percentage of 3.6 with evidence of reinfection disease.

In the fall of 1942, the Bureau of Tuberculosis began a study of tuberculosis control in the State hospitals of California. Each institution was visited, and it became evident that wide differences existed. Only one institution (Sonoma) did routine x-ray examination of patients (and upon admission only), and had a pneumothorax clinic. At another (Camarillo), a staff physician, with training in tuberculosis, had recently begun a program of fluoroscoping the resident patient population. At Patton a physician patient awaiting discharge was studying the known tuberculous from the standpoint of therapy. (The Langley Porter Clinic, which opened subsequently, has from the start taken standard x-ray films on all new admissions.) At the other institutions, there was no formal case-finding program. When tuberculosis was discovered by clinical methods alone, it was commonly far advanced, and partial isolation was instituted until the patient could be transferred to Sonoma, Napa, or Patton.

TWO THOUSAND EXAMINATIONS GIVEN

However, each institution had standard x-ray equipment. In order to make a start, even though at the time x-ray film was difficult to obtain, the Bureau suggested that x-ray films be taken on all employees, and undertook to read the films. A schedule of fluoroscopic examination of patients on the most deteriorated wards was begun at Patton, Norwalk, and Pacific Colony, and up to the first of July, 1943, over 2,000 such examinations and film interpretations were made by the Bureau, while Dr. Baker expanded his survey at Camarillo.

Patton State Hospital, with 250 segregated tuberculosis patients, had no staff physician with training in tuberculosis, and Dr. Webster, the Superintendent, created a position for a tuberculosis physician, which was filled on July 1, 1943, by Dr. R. E. Smith. In addition to giving supervision to the resident tuberculous, Dr. Smith speeded up the survey program at three institutions, visiting Norwalk and Pacific Colony at frequent intervals. As of the present time, almost 10,000 examinations have been made in the four southern institutions. Among these were all the employees. From 15 per cent to 20 per cent of the fluoroscoped patients have had films also. We are not satisfied with the fluoroscope, but are using it until additional equipment and personnel have been obtained.

Of the patients hitherto unsuspected of harboring infection, from 4 per cent to 5 per cent were shown to have active pulmonary tuberculosis. The highest percentages were found on the most deteriorated wards and among patients committed for chronic alcoholism.

MOBILE UNIT PURCHASE PLANNED

Until adequate segregation is provided for every tuberculosis patient discovered in the institutions, and until we have discovered each such patient, the tuberculosis rate will continue to be high for reasons inherent in the high initial infection rate, the type of patient, and the crowded wards. In addition to the 600 previously-diagnosed tuberculous in the institutions, we have discovered between 200 and 300 patients with active disease. On the basis of 5 per cent of the unsurveyed patient population, there remain still 1,000 undiagnosed tuberculous. Among the 10,000 patients admitted annually to all the institution, 150 come in with infection. For every one who enters with tuberculosis, two more have been acquiring it during their commitment.

The Department of Institutions plans to meet this problem by the purchase of one 4x5 mobile x-ray unit, with employment of adequate personnel for its operation and the processing of the films. This truck will move from institution to institution and take films of the entire patient

and employee population at each. To make possible the segregation of the tuberculous who are being found and who will be found, the post-war building plans of the Department of Institutions call for four new tuberculosis buildings; additions to the units at Napa and Patton, and new units at Sonoma and Pacific Colony. These buildings will aggregate enough beds to segregate all the patients whom we expect to find, but they will be so constructed that they can be converted, ward by ward, for the use of patients who have no tuberculosis. This is a wise provision, because, once the initial survey and segregation have been accomplished, the number of beds necessary for tuberculosis will rapidly decrease. Intramural infection will become uncommon. When buildings are ready for occupancy, additional physicians with training in tuberculosis will be engaged, and these specialists, in addition to their clinical tasks, will play a major rôle in the survey activities.

It is impossible to avoid the conclusion that the undiscovered tuberculosis in our mental hospitals is one of the most concentrated and dangerous reservoirs of infection in the State. By means of discharged and paroled patients, it seeps continuously into the general community. The Bureau of Tuberculosis feels that its contribution to the control of this menace is one of the most rewarding activities in which it is currently engaged.

217 West First Street.

TUBERCULOSIS IN SONOMA STATE HOME*

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Eldridge

THE Sonoma State Home was opened on its present site in November, 1891, with a population of 150.

The first unit for tuberculous patients was built with a capacity of 42 in 1912, when we had a population of approximately 1,000. Additional units have been added since, so that now we have patients in four different buildings for both sexes, with a bed capacity of 121, with extensive overcrowding.

The total population in the Institution on March 1 of this year was 4,186 with 3,286 actually in residence, the remainder being on parole and escape. The total number admitted, since the opening in 1891 to March 1, 1944, was 12,093.

The average age on admission is approximately 17 years and the average age at death of all cases approximately 27 years, or a life span of ten years as against the average for normal individuals, as you know, around 63 years. We feel this short life span is due to the physical and mental condition of the majority of patients received. This particular type of low-grade patient is undoubtedly a factor for the increased percentage of the tuberculous over that of normal individuals. Also, there is more overcrowding in our low-grade cottages.

PRESENT X-RAY POLICY STARTED IN 1934

It has always been the policy of the Institution to segregate and treat active communicable pulmonary tuberculosis. However, it was not until 1934 that we arranged a definite system of tuberculin testing all patients and x-raying all positive reactors. This survey has continued to the present time. During this period of 10 years, 6,485 patients have been examined, 500, or 7.7 per cent of which have been diagnosed as having tuberculosis. They were classified as follows: 186 minimal, 157 moderately advanced, 41 advanced, 19 miliary, 40 childhood, 44 arrested, 1 tubercular spine, 7 unclassified. Of these 500, 67 per cent were idiots and imbeciles, and the other 33 per cent morons and borderlines, thus bearing out that tuberculosis does predominate in the lower group mentally and physically, and where overcrowding is most prevalent. Some 145, or 16 per cent of our deaths in the institution, are due to tuberculosis, their average at death being 23 years. Average age at time of diagnosis is 24 years.

In July, 1941, because tuberculosis occasionally occurred in a "negative tuberculin" patient, it seemed wise to have at least one x-ray on record of every patient in the institution. Therefore, it has developed that we x-ray, tuberculin test and obtain a clinical record of every new patient in the institution, and we have extended the x-ray survey to include all old patients, until by now nearly all have been either x-rayed or fluoroscoped. All negative tuberculins are repeated in one year. All patients going out on parole are x-rayed unless they have been examined in recent months.

FLUOROSCOPIES EVERY SIX MONTHS

In the past year, because of the shortage of film and storage space, an extensive fluoroscopic program has been instituted, with the goal that almost every patient in the institution be fluoroscoped every six months and x-rayed at the time of fluoroscopy, if indicated. The interval of six months was chosen because there had been several instances where apparently negative chests had been found to have developed communicable tuberculosis within a year following examination. The elderly and extremely crippled patients are gradually being deleted as soon as their chests are determined to be negative for tuberculosis. They are to be checked when indicated.

All new employees are tuberculin tested and x-rayed. All employees with tuberculosis are referred to their family physician for care and treatment. Arrested cases are checked in the institution twice yearly. Some survey work has

* From the Sonoma State Home, Eldridge, California.
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